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Mendeley Readership Count: An Investigation of Sambalpur University Publications from 1971-2018

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Abstract -

Mendeley offers readership statistic to publications and use these readership statistics to evaluate research performance of an individual. The primary purpose of this paper is to investigate the Mendeley readership counts of Sambalpur University's publications from 1971 to 2018. In this study; bibliographical data exported from Scopus using affiliations search tab and exported data between1971 to 2018. A total of 1553 records were found. The exported data converted into a text file and run in Webometric Analyst software and exported the Mendeley readership data from Mendeley website. A total 1399 record existed in the Mendeley database, in which 173 data have no readership found and further, 1226 publications data analyzed. The readership statistics of Sambalpur University have no impressive growth. Further study found that the yearly growth of Mendeley readership was not stable, and it fluctuated over time. There were positive 0.3303 correlations between Scopus citation and Mendeley readership of the published papers. Mendeley readership statistics by country found that most of the readers are from India, followed by the United States.

Keywords–Mendeley, Readership Count, Mendeley Readers, Citation Count, Sambalpur University, Altmetrics

Introductions:

Nowadays, academic, social networking sites such as ResearchGate, Academia, and Mendeley have been widely used by the researchers, students and academics for their research work (Katchanov, Markova, &Shmatko, 2019). Mendeley is a powerful citation management device broadly used by means of academics. It was originally developed by Gregor Mendel and Chemist Dmitri Mendeleye and launched in 2007 in London (MacMillan, 2012; Pooladian& Borrego, 2017). Later, it was obtained through Elsevier in April 2013 (Rodgers and Barbrow, 2013). Approximately 6 million customers registered their name globally at Mendeley website (Mendeley, 2020). Mendeley reference management tool has been used for storing, capturing information management and citation. A user can create a group and share facts about scientific publications (Thelwall, 2019). In addition, it provides readership statistics to the indexed literature. It is a popular source of altimetric data (Zahedi & van Eck, 2018). Mendeley also provides readership statistics. However, the coverage, density, and distribution of Mendeley readership vary significantly throughout disciplines. The bibliometric method has been used to evaluate the research performance of individual and discipline. It is also recognized internationally (Bornmann, 2014). Although citations provide academic values to the researchers, however, it took a long time to collect citation to the published paper (Li, Thbelwall, &Giustini, 2012) whereas, Mendeley provides an early impact of the published literature by displaying readerships statistics to indexed papers (Thelwall, 2017b). There have been large numbers of literature documented on the counting of Mendeley readership and correlated with citations. However, there is no previous study conducted on University level using Mendeley readership and their early impact of published papers. Sambalpur University is located at Burla, Western Odisha, Sambalpur. The University began operating from 1st January 1967, and The University provides Post-Graduate education and learning in 27 subjects via 20 Post-Graduate Departments (Sambalpur University, 2020). It has published 13312 Scopus database papers between 1971 to 2018 (Scopus, 2020).

Objectives –

The purpose of the current study is to examine the current trends and visibility of literature published by Sambalpur University during the period 1971-2018 in Mendeley. The study is to review the characteristics of Scopus publications and compare with Mendeley readership statistics. The authors also investigate Mendeley readership by document type, discipline, country, designation and ranking of top Mendeley readership papers. The study also correlates Scopus citation with Mendeley reader.

Reviews of Literature:

There is a large literatures body available on Mendeley readership. However, in this study, only considered papers related to Mendeley readership count of University and other Institutions or

fields based on citation count. In a recent study compared Scopus citation and Mendeley readership count of DESIDOC Journal of Library & Information Technology by using Webometric Analyst software. There were a total of 6132 readership counts in 91 articles. The author noted that there were positive 0.3217 correlations between Scopus citations with Mendeley readers (Parabhoi&Verma, 2019). An investigation based on U.S. Computer Science conference paper and journal articles during the period 1968-2018 and correlated them. There were higher positive correlations found among Scopus citations count and Mendeley reader counts (Thelwall, 2019).

The gender differences in citation impact investigated and compared with Scopus citations and Mendeley readers of research from five countries India, Spain, Turkey, the U.K., and the USA in up to 251 fields with the first author. The author has reported that female research workers were less readership count in India compare to Spain. Similarly, a smaller amount of research workers cited in Turkey (-4.0%) and India (-3.6%) while, more cited in Spain(Thelwall, 2018). It has been found that Mendeley readership count and citation count are strongly correlated with each other, and Mendeley will lead the more citations(Ravi Kumar&Dohtdong, 2018). Further, the study found that 4886 articles were cited 3, 33,784 times and ρ value was 0.715. It has been reported by (Zahedi, Costas &Wouters, 2017) that Web of Science publications with DOI published between 2004-2013 with five major scientific fields and 86.5% of the papers were covered by Mendeley and found at least one reader. The importance of Mendeley readership metrics was seen; emphasizes the impact in the publications and received late citations. It was found that 53% of papers (16,667) had at least one reader in Mendeley and total 31,629 numbers of readerships count (Maleki, 2015). The study compared Mendeley readership counts and correlated with citation between Scopus citation and readers in all medical fields. It also depicted that 332975 articles in 45 medical areas in Scopus; citation counts correlated 78% articles had at least one reader in all fields(Thelwall& Wilson, 2016). The study indicated that Mendeley reader counts are the leading Altmetrics indicator of scholarly impact in any areas. This study also further noted that Mendeley reader counts were consistent with future citation impact andAltmetric.com scores can allow the researchers for future citation counts (Thelwall & Nevill, 2018). The Google Scholar citation counts from dissertations which were indexed by Google. It was reported that Google Scholar citation counts 77,884 numbers of American doctoral dissertations from 2013-2017 via ProQuest. Google Scholar citations were count and then compared with Mendeley readership count, and it was found that at least one citation recorded in Google scholar within five dissertations. Mendeley readership count is useful to assess the impact of dissertations, which are not old than two years and Google scholar citations are useful for more past dissertations (Kousha & Thelwall, 2019). The journal articles citation was compared among Scopus citation counts, Microsoft Academic citation counts and Mendeley reader counts of 172,752 articles in 29 journals during the period 2007-2017, it was found that Microsoft Academic has more citations in comparison to Scopus and fewer citations than Mendeley readers (Thelwall, 2017). The study compared Mendeley readership with Scopus citations of one hundred cited papers in Physics in the year 2005 to 2010. Authors point out that there was a positive correlation found between Citation and Mendeley readership both selected years 2005 and 2010(Shrivastava & Mahajan, 2016). Recently (Ouchi et al., 2019) compared the highly one thousands of Nature with Altmetrics data. The study mentioned that 98.9 % of papers

had present in one or more social media platform in which the highest number of publication found Mendeley database with 98.9%. The study counts the average Scopus citation with Mendeley reader count of a total of 104,520 articles from ten Discipline. Further, mentioned that Mendeley readership found on average from 0.1 to 0.8 per publications of 10 disciplines(Thelwall, 2017). The 15 months of evaluated bookmarked papers on Mendeley find out 3813 article published on Library and Information Science (LIS) papers in 2014. The study mentioned that 87.6% of publications were bookmarked in May 2016, and 55% of documents were cited (Pooladian & Borrego, 2017)

Method:

Mendeley readership data is useful source Scientometrics study, and Mendeley also provides readership statistic data with free via Application Programming Interface (API). The dataset for the evaluation collected manually making use of the Scopus database using affiliation search "Sambalpur University" and exported bibliographical data between 19710 to 2018 on 26th June 2019. A total of 1553 records were found at Scopus database. Mendeley readership data were gathered using the Webometric Analyst 4 free software (Thelwall, 2017b) for 1553 records indexed in Scopus. Finally, 154 records were not found in the Mendeley database and 1399 records found in the Mendeley database in which 173 have no readership found. The 1226 records were analyzed using Ms-excel and Spearman correlation calculated using Webometric Analyst 4.

Data Analysis

Growth of Readers

Figure 1 shows the yearly growth of Mendeley readers between 1971 and 2018 published paper by Sambalpur University. The highest growth of the reader (1245) has seen in the year 2011 and the lowest (0) has seen in 1971, 1973 and 1976. From Figure 1 it is clear that the yearly growth of Mendeley readership was not stable, it fluctuated over time. Till 1996 the growth of Mendeley reader was not so impressive. However, in the year 1997, it took an exceptional growth and touch 599.

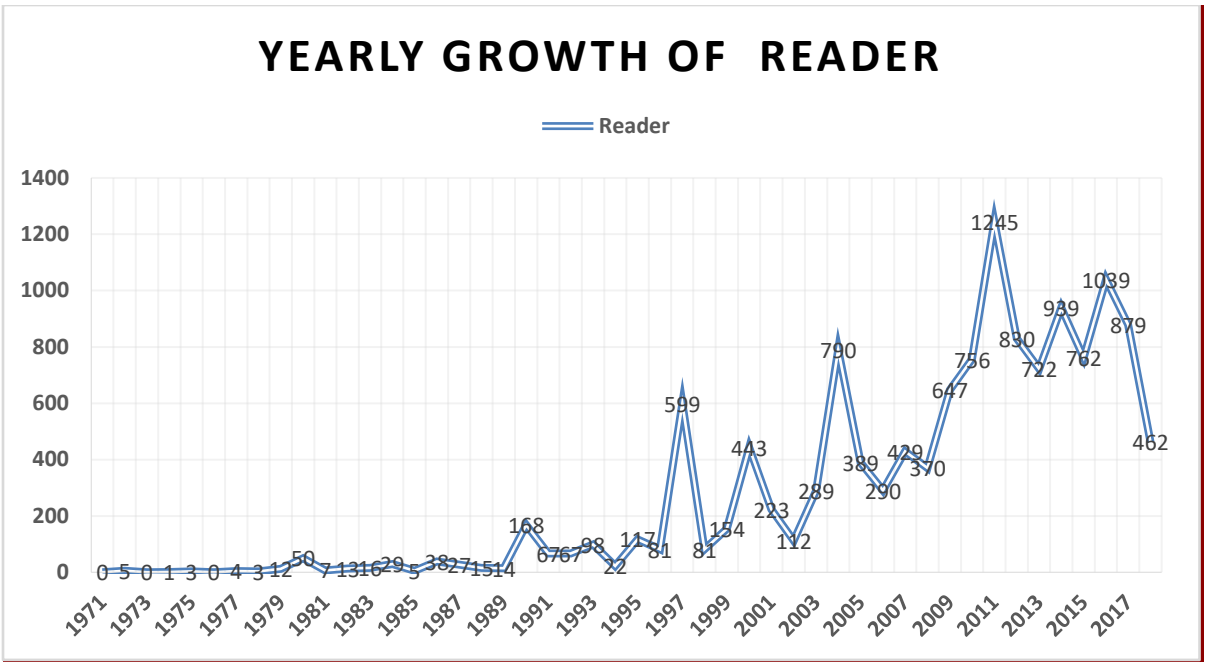

Figure: 1 Yearly Growth of Reader

Types of Documents with Reader

Figure: 2 display the types of documents with readers. It gives a clear indication that more than one third of the Mendeley readers like to read articles (10017) whereas, a small number ofMendeley readers read article in press (6). It is also noted from the below figure that review (2011) has the second-highest Mendeley reader count followed by conference paper (843) and book chapter (254).

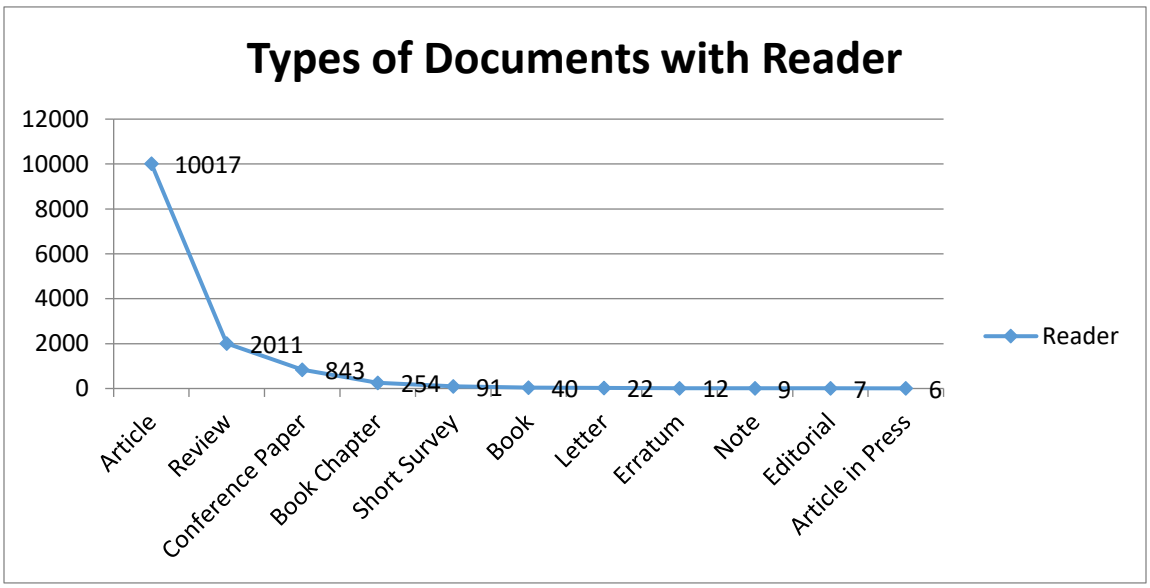

Figure: 2 Types of Documents with Reader

Distribution of Readership Statistics by Discipline

Mendeley classifies readers into 29 broad disciplines mentioned in the Table. 2. Significantly more number of readers (2388) comes from Agricultural and Biological Science discipline than the other discipline mentioned in the below table. While, the lowest readership counts from Sports and Recreation discipline (5). From the below Table. 2 it can be said that Chemistry (2192) was the second-highest readership followed by unspecified (1828) discipline.

Table: 1 Readership Statistics by Discipline

SL No	Subject	Readership
1	Agricultural and Biological Sciences	2388
2	Chemistry	2192
3	Unspecified	1828
4	Engineering	962
5	Physics and Astronomy	777
6	Environmental Science	687
7	Materials Science	608
8	Computer Science	534
9	Artsand Humanities	525
10	Biochemistry,Genetics and MolecularBiology	505
11	Business,Management,andAccounting	481
12	Social Sciences	470
13	MedicineandDentistry	295
14	EarthandPlanetarySciences	244
15	ChemicalEngineering	191
16	Pharmacology,ToxicologyandPharmaceuticalScience	129
17	Mathematics	88
18	ImmunologyandMicrobiology	65
19	Psychology	63
20	NursingandHealthProfessions	61
21	Economics,EconometricsandFinance	52
22	Design	45
23	Energy	41
24	Neuroscience	31
25	Linguistics	18
26	VeterinaryScienceandVeterinaryMedicine	15
27	DecisionSciences	6
28	Philosophy	6
29	SportsandRecreations	5
	Total	**13312**

Ranking of Top Ten Readership Papers-

Table. 2 shows the ranking of top ten readership papers along with the year of publication and the total number of readers. Paper has been read by readers as per their requirement and relevant to their research work and Mendeley readership statistic provides the early impact of the published paper than citation. Over time it may be converted into the citation. From the analysis given at the Table. 2, it is apparent that the title "Chemical modification of silca surface by immobilization of functional groups of extractive concentration of metal ions" by P. K Jal,S. Patel and B. K Mishra and published in 2004 has the first ranked readership paper with 541 readership counts. On the other hand, "Agricultural intensification, soil biodiversity and agro ecosystem function in the tropics: The role of earthworms" by Fragoso C. ...[et al.] has the second-highest readership paper with 537 readership count. It also revealed that "Anharmonic oscillator" by Kumar Patnaik P. was the lowest-ranked readership paper (113) in the top ten readership paper table. Further, noted that both early published and the recently published paper got placed on the top highly readership papers.

Table: 2 Ranking of Top Ten Readership Papers

Rank of paper	Title	Authors	Year	Readers
1	Chemical modification of silica surface by immobilization of functional groups for extractive concentration of metal ions	Jal P.K., Patel S., Mishra B.K.	2004	541
2	Agricultural intensification, soil biodiversity and agroecosystem function in the tropics: The role of earthworms	Fragoso C., Brown G.G., Patrón J.C., Blanchart E., Lavelle P., Pashanasi B., Senapati B., Kumar T.	1997	537
3	Cyanines during the 1990s: a review	Mishra A., Behera R.K., Behera P.K., Mishra B.K., Behera G.B.	2000	389
4	Relevance of emotional intelligence for effective job performance: An empirical study	Mishra P.S., Mohapatra A.K.D.	2010	334
5	Transition-metal-based layered double hydroxides tailored for energy conversion and storage	Patel R., Park J.T., Patel M., Dash J.K., Gowd E.B., Karpoormath R., Mishra A., Kwak J., Kim J.H.	2017	220
6	Oxidation by permanganate: synthetic and mechanistic aspects	Dash S., Patel S., Mishra B.K.	2009	189
7	Review on bacterial biofilm: An universal cause of contamination	Satpathy S., Sen S.K., Pattanaik S., Raut S.	2016	148
8	A brief review on phytoconstituents and ethnopharmacology of Scopariadulcis Linn.	Mishra M.R., Behera R.K., Jha S., Panda A.K., Mishra A.,	2011	137

	(Scrophulariaceae)	Pradhan D.K., Choudary P.R.		
9	Forests, people and power: The political ecology of reform in South Asia	Springate-Baginski O., Blaikie P., Banerjee A., Bhatta B., Dev O.P., Ratna Reddy V., Gopinath Reddy M., Saigal S., Sarap K., Sarin M.	2013	133
10	Anharmonic oscillator	Kumar Patnaik P.	1990	113

Distribution of Readership Statistics by academic status

Mendeley offers the readership statistics by different user group i.e. Graduate students, M.Tech and Ph.D. Student etc. In this analysis, we categorized a broad group by merging of narrow groups like Student group (it includes, Ph.D. Student, Doctoral Student, Postgraduate, Master, Bachelor), Faculty group (Professor, Associate Professor, Senior Lecturer, Lecturer). Figure.3 shows the readership statistics by designation wise. Closer inspection of the figure – 3 shows that the student group has the highest level of readership with 7247 followed by the Researcher group with 2343, faculty group with 1919 and unspecified group with 1049 readership count. However, the Librarian group has been found with lowest readership count with 245. It is very much essential for the librarians group to read articles/papers as they play an important role to provide information service to their users. On the other hand, result indicates that the student community, researchers and professors group frequently read articles.

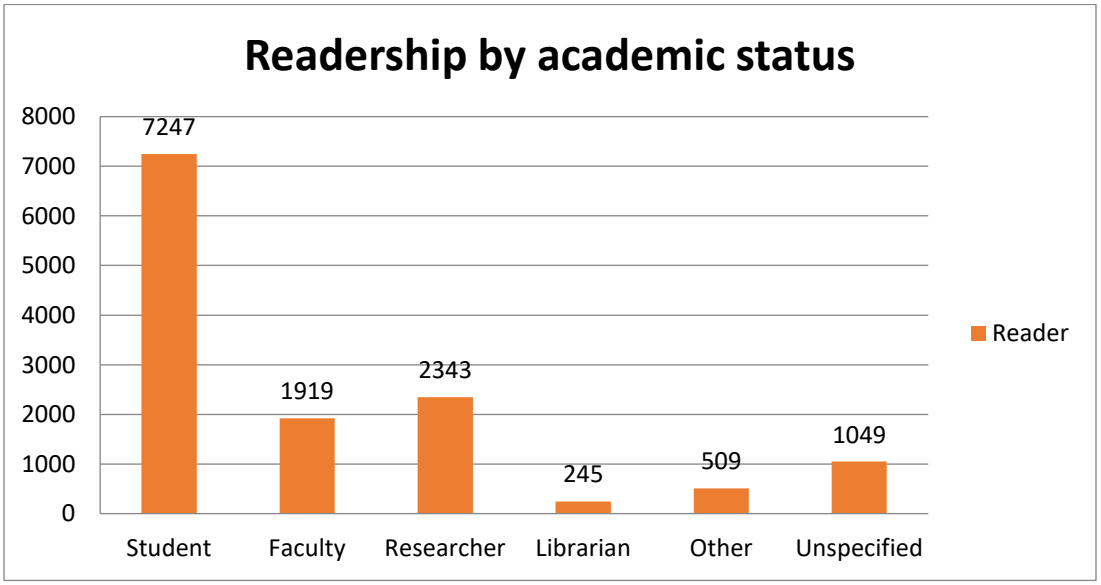

Figure: 3 Readership by academic status

Spearman Correlations between Citation and Readership-

To address the correlation between Scopus citation and Mendeley readership, the Spearman Correlations was calculated by using Webometric Analyst. The data were co-related between the Scopus citation and Mendeley readership. It was found positive 0.3303 correlations between Scopus citation and Mendeley readership of the published papers by the research community of Sambalpur University.

Table 3-Correlations between Citation and Readership

Correlation All	Record CountAll	Omitted Count All	Correlation No Blanks	Record Count No Blanks	Omitted Count No Blanks
0.3303	1174	379	0.3303	1174	379

Distribution of Mendeley Readership Statistics by Country

Figure. 4 discussed the distribution of Mendeley readership statistics by country wise. Mendeley has a provision to provide the readership data by geographical level. It is clearly shown that most of the readers are from India (16%), followed by the United States (12%), Brazil (8%) and United Kingdom (5%). Because of the geographical location of the Sambalpur University from India. It can be said that most of the readers from the same geographical location, i.e. India. However, it is quite impressive that, readers attract from different geographical local.

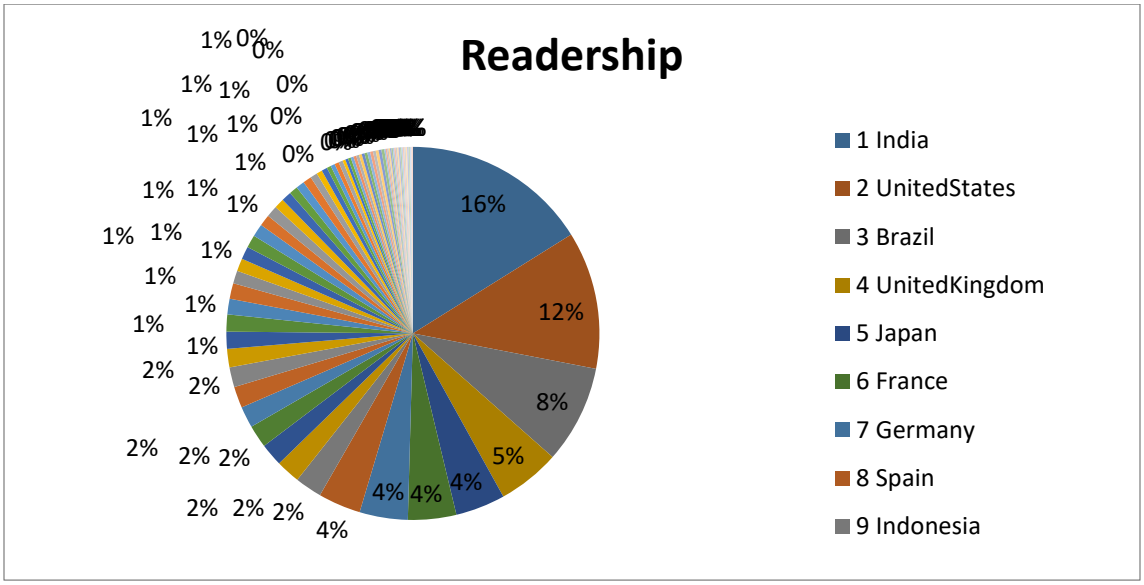

Figure: 4 Distributions of Mendeley Readership Statistics by Country

Discussion and Conclusion:

From this present study, it can be concluded that research contributions of Sambalpur University between 1971 and 2018 had a quite good readership statistic though; there are some areas needs to be improved. If we exclude the initial years, it has a remarkable growth of readers but growth is unstable. Readers from all disciplines read papers published by Sambalpur University and found quite a good number of the readers except subjects from Sports and Recreations, Philosophy, Decision Science, Veterinary Science, and Linguistics. The study also revealed that Agricultural and Biological Sciences, Chemistry and Unspecified discipline had greater readership statistics.By review of readership statistics by different types of documents, it was noted that articles, reviews, and Book Chapter had the highest readership count than other types of documents such as book chapters, books, letters, and notes, etc. The study found that low readership counts from Librarian Group. Perhaps mostly publications are published in pure scienceand engineering field. Due to the difference in disciplines, the readership count may be low in case of Librarian.

The result of the study motivated the librarian's group to improve as they had the lowest number of readership count. However, the Student group read the most of publications as compared to faculty, researchers, unspecified, other and librarian groups. Furthermore, the result of the study also reveals that the most of the readers are from India. As the Sambalpur University is located in India and majority of the published articles are related to India, therefore most of the readers are from the same geographical region i.e. India followed by the USA. Mendeley offers an early impact on the research publications and it can be useful during research evaluation. In the future, these readership statistics can be used and compare to later citation received in the publications.

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